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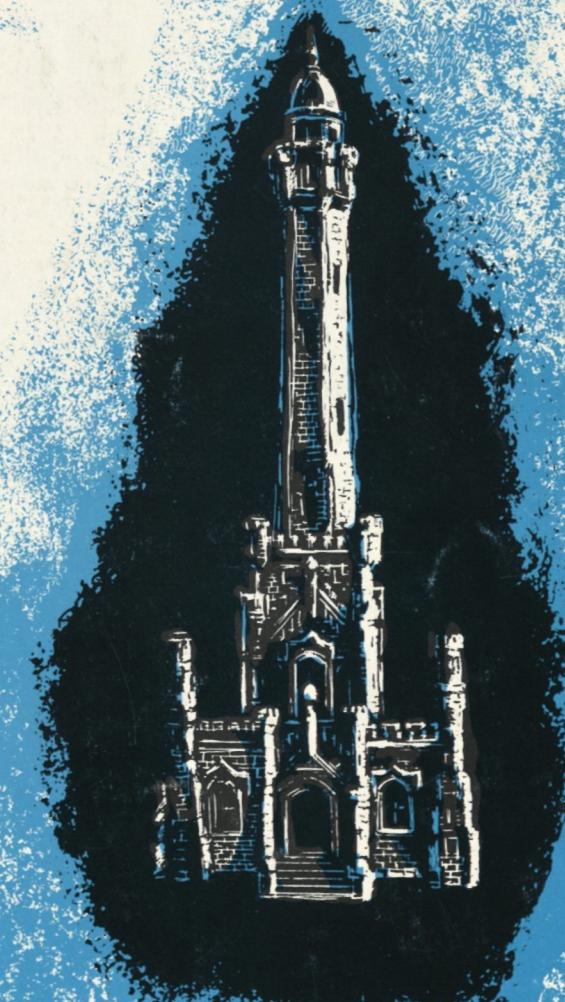
STATE WATER SURVEY DIVISION
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1960 annual report

DEPARTMENT OF WATER AND SEWERS

City of Chicago

Richard J. Daley, Mayor



THE CHICAGO CITY COUNCIL

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Mayor

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President Pro Tem

JOHN C. MARCIN
City Clerk

ROBERT J.
Deputy

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21. Charles S. Bonk	46. James F. Kuehl
22. Otto F. Janousek	47. John J. Kuehl
23. George J. Tourek	48. Morris Hirsch
24. Benjamin F. Lewis	49. Paul T. Williams
25. Vito Marzullo	50. Jack I. Spiegel

(1) Resigned November 25, 1960
(2) Resigned December 7, 1960
(3) Deceased August 16, 1960

Edward J. Padden, Chief Clerk
William F. Harrah, Sergeant-at-Arms
Clement J. McDermott, Assistant Sergeant-at-Arms
Michael Coletta, Assistant Sergeant-at-Arms

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C49ar ANNUAL REPORT,
1960, DEPARTMENT OF WATER
pt.1 AND SEWERS, CITY OF
07081003 CHICAGO.

No matter how grey the day
and finest filtration plant
clear pure water product.

DEMCO



**DEPARTMENT OF WATER AND SEWERS
ANNUAL REPORT FOR 1960**

628
C49ar
1960pt. I

The Honorable Richard J. Daley, Mayor
The Honorable Members of the City Council
City of Chicago, Illinois
Gentlemen:

Among the most significant factors contributing to the growth and greatness of Chicago are its publicly operated waterworks and sewer systems.

This report describes the activities of the employees who operated and expanded these systems during 1960. Through their efforts Chicago became a healthier, safer, better, and more prosperous City in which to live. Two separate technical supplements to this report — describing the activities of the Bureau of Water and the Bureau of Sewers — are available upon request.

Chicago's water and sewer systems operated without interruption during the year and were steadily expanded in anticipation of the future needs of a great and growing metropolis.

Thirty-five miles of water mains and 70 miles of sewers were constructed and placed in service during the year. Work went forward to modernize and expand the purification, pumping, tunnel, distribution and drainage capacities of both utilities.

The waterworks pumped 376 billion gallons of water to commercial and industrial users and 4.4 million persons residing in a 385 square mile area of Chicago and the 58 suburbs served by the system.

Total water fund revenues, including income from permit fees and other miscellaneous sources, in 1960 amounted to \$41,358,286.

The employees of the Department performed effectively throughout the year and, as a result, no unusual incidents were encountered which hampered the utilities from operating at optimum capacity. Their performance, in terms of safety, won for this Department the Award of Honor of the Illinois Section of the American Water Works Association for the fourth consecutive year. The Department also accepted the Award of Merit of the National Safety Council for its performance.

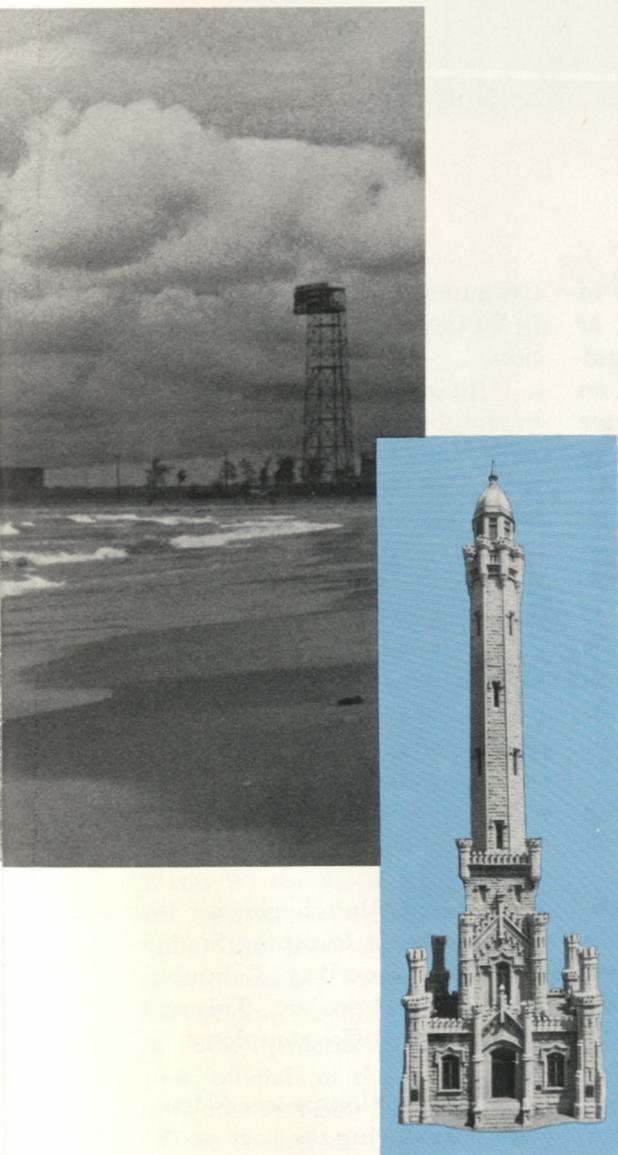
We wish to express publicly our appreciation to every employee for a job well done, as well as to other agencies of government, industrial groups, and to the people of Chicago for the support and co-operation which they have extended to this Department since it was created on January 1, 1953.

And, finally, Mr. Mayor, we wish to thank you and the City Council for your guidance and support—help which has contributed so greatly to the progress made by this Department since its establishment. You may be sure that we will continue to strive to improve these services to the public — services vital to the health, safety, security, prosperity and well-being of the citizens of our great metropolitan community.

Respectfully submitted,

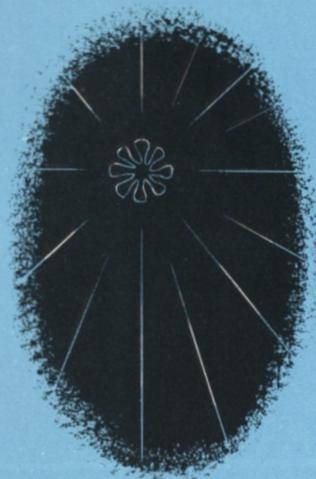
JAMES W. JARDINE

Commissioner



Old Water Tower — was the beginning of the new Chicago. Virtually the only structure to survive the Great Fire of 1871, this Tower symbolizes the "I Will" spirit of the City to endure and grow. On its walls are plaques dedicated to great Chicago waterworks engineers.

HIGHLIGHTS



376,232,000,000 gallons of water were pumped in 1960, or an average of **1,030,000,000** gallons a day. The peak hour, an all-time record, was at the rate of 1,841 million gallons a day at 3 p.m. on September 1, and the peak day for the year was September 7, when the total pumping for the day was over **1,499,000,000** gallons.

The water distribution system constructed and placed in service 35 miles of water mains — seven miles of feeder mains of over 24" in diameter.

The program of pumping station modernization continued throughout the year.

The last of six new boilers was placed in service in Mayfair Pumping Station and steam pressure was increased there from 200 pounds per square inch to 235 pounds per square inch.

A new 50 million gallon per day pump was placed in service in 68th Street Pumping Station; a new 60 million gallon per day pump was placed in service in Springfield Pumping Station; and a new 85 million gallon per

day pump was placed in service in Western Avenue Pumping Station.

In addition, improvements in the discharge header systems were made in Cermak and Rose-land Pumping Station. At the latter, a new stack was placed in service.

Two sets of new 50 KVA transformers replaced one set of 25 KVA transformers in Jefferson Pumping Station, where the new auxiliary light and power transformer installation has been completed. And new fluorine and chlorine feeding units were installed in Lakeview Pumping Station.

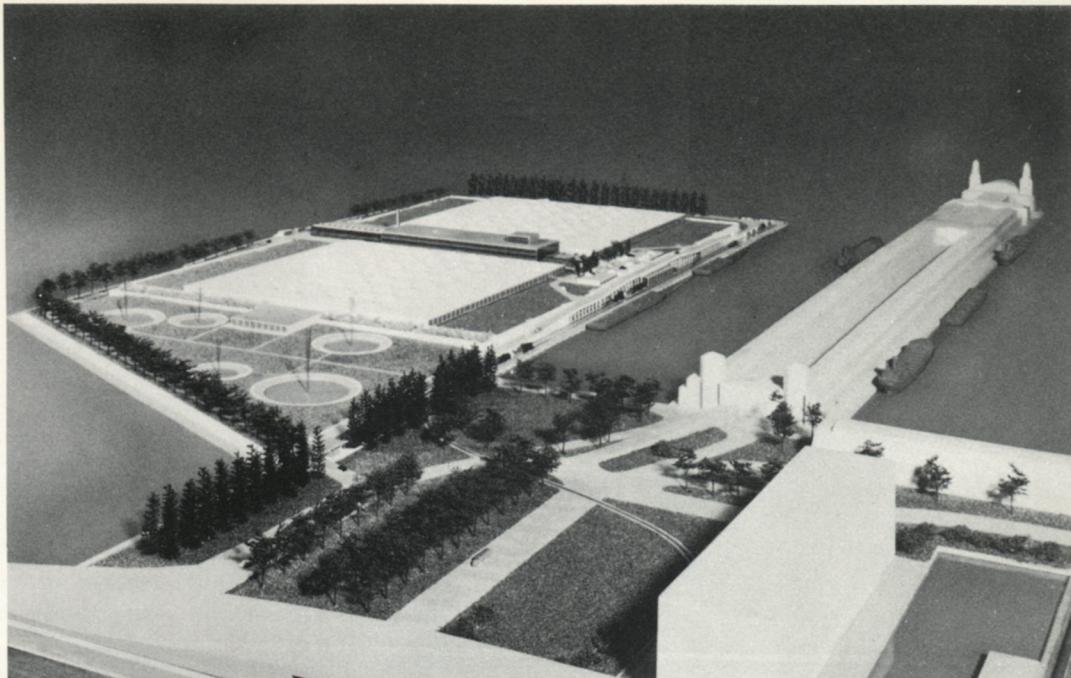
Construction began on the new Southwest Pumping Station and the connecting Columbus Avenue tunnel project. This unit was about 40% completed at years end.

Construction proceeded at a good pace during the year on the new Central District Filtration Plant. This 960 mgd filtration plant, to be the largest such plant in the world, was about 64% completed by December 31, 1960.



Nearly 70 miles of sewers were added to Chicago's sewer system during 1960.

Architectural
Prize-winner —
Chicago's Central District
Filtration Plant shown
here in model will be
more than the world's largest
water purification plant.
Its design has been
praised for its beauty
and efficiency.



The underground leakage control program saved over 10 million gallons of water a day.

Seventy miles of sewers of all sizes, 3,701 catchbasins and 2,087 manholes were constructed and placed in operation in the Chicago public sewer system.

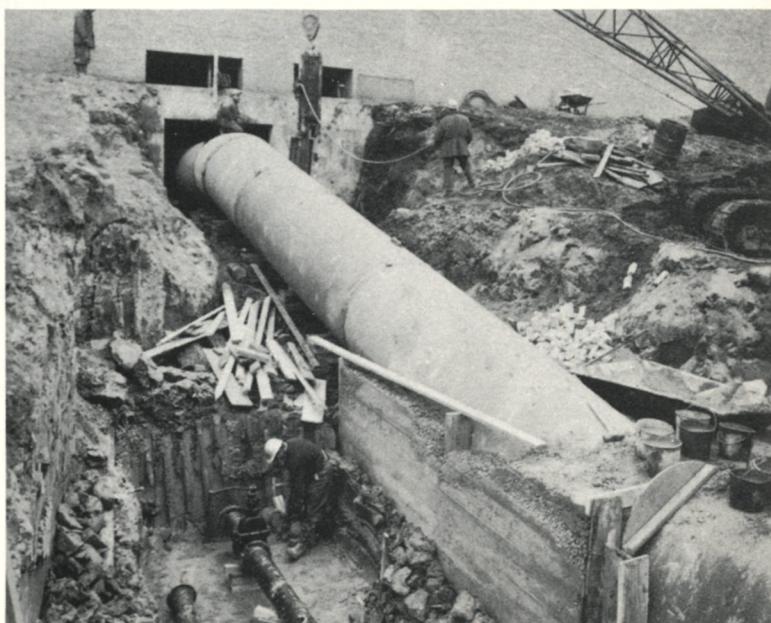
113 street grades and 24 standard bench monuments and ordinary benches were established by the Bureau of Sewers, which also completed 20,748 repair jobs.

The Bureau of Water received in 1960 the "Award of Honor" for 1959 from the Illinois Section of the American Water Works Association. It was the fourth consecutive year the utility has received this distinction, presented for the Bureau's outstanding record in the field of safety practices. During the year, officials of the Department of Water and Sewers also accepted the Award of Honor for the year 1959 from the National Safety Council.

Total revenue collected by the Water Collection Division amounted to \$40,071,261.



Above — Columbus Avenue Tunnel, shown here under construction, will extend 2.8 miles from 73rd Street and Western Avenue to Southwest Pumping Station at 84th Street and S. Kedvale Avenue. It is 12 feet in height.



This 54 inch diameter main will carry water from Cermak Avenue Pumping Station to Near South Side and southerly portion of Loop.

PURIFICATION



Water Purification Division: Operates and maintains the filtration plants, fluoridation and chlorination controls at pumping stations; collects water samples continuously and tests for purity.

More than 133 billion gallons of water was processed by the South District Filtration Plant during 1960.

Years of intensive research in high-rate filtration by water chemists and engineers at the South District Plant again proved rewarding in 1960, enabling them to meet the high demand periods successfully throughout the year. At 9 p.m. on September 7, the Plant, which has a rated capacity of 320 million gallons per day, processed water at the rate of 660 million gallons per day — a new hourly record.

Two of the Plant's 80 filters were rebuilt incorporating a new system of gravel grading developed recently by Plant hydraulic experts.

A new system to safeguard purity of water after it leaves the Plant was inaugurated. This system, involving the use of new equipment for handling anhydrous ammonia, replaces the ammonium sulfate used in the chlorine-ammonia treatment system which has been in use since 1954. An economy move, the new system reduces the cost of handling ammonia in the Plant.

A chlorine evaporator, a device for vaporizing liquid chlorine, was installed in 1960. It permits liquid chlorine to be removed from the steel cylinders in which it is shipped without

use of water baths, heaters, pipes and other machinery.

The scientists at the Plant continued their pioneering efforts in research including radiology, bacteriology, and microbiology, to devise ever-improved methods for safeguarding and supplying pure water to 1,500,000 users in Chicago and adjacent suburban areas of the South Side.

A major function of the Water Safety Control Section is the control of the quality and purity of the water supply. In conjunction with the routine water quality control program, many diversified activities were undertaken to safeguard the water supply. Daily water samples were collected and submitted to the laboratories for bacteriological examinations and chemical analyses. The results of these tests indicated that the water being supplied to the consumer was of better bacterial quality than the standard recommended by the United States Public Health Service.

Some 50,288 water samples were collected and inspected during the year from different parts of the Water System.

The section supervised 214 water main sterilizing operations, sterilizing a total of 164,707 lineal feet of main, varying in size from 6 inches to 54 inches.



Laboratory of South District Filtration Plant where continuous tests are run to safeguard purity of water supply.

Surveys for water quality were made in the areas of 29 extra alarm fires.

A total of 324 consumer water quality complaints were processed during 1960. In addition, 17 large buildings and two steamships were inspected for water quality. The section made 85 sanitary inspections in suburban communities supplied by the Chicago Water Works System.

The waters of the Calumet River and the Indiana Harbor Ship Canal were sampled each

week. Samples of water were collected from the South Lake area, the Harbor area, the North Shore area of Lake Michigan. Several boat trips, from near the Wilson Avenue Crib north to Waukegan, were made for observing conditions, and collecting samples of water.

Section dredging inspectors also checked and controlled dredging and dumping operations in the lake, along the shore and in adjacent waterways.

PUMPING



Pumping Division: Operates and maintains 10 pumping stations, four water intake cribs and the Hegewisch Sewage Pumping Station.



Looking out from Southwest Pumping Station — a 175 million gallon per day capacity plant to be completed in 1962. Engineers have made provisions to expand pumping capacity to 275 million gallons per day when warranted by demand.

Chicago's 10 pumping stations furnished an uninterrupted supply of water to all parts of the City and 58 suburban communities throughout the year. These stations pumped a total of more than 376 billion gallons of water; 1.5 billion gallons of this total was pumped on September 7, the peak day. The pumping sta-

tions of the North and Central Water Districts applied 1,335 tons of liquid chlorine to destroy bacteria, and 3,988 tons of hydrofluosilicic acid to maintain a continuous ratio of one part per million throughout the water supply as directed by the Water Purification Division.

Three new pumps were installed in 1960, one each at the Springfield Avenue, Western Avenue and 68th Street Stations. Their installation increased the capacity and reliability of the water system. There are now a total of 49 pumps available for service, having a combined rated capacity of 2,695 billion gallons daily. This provides built-in dependability — a reserve capacity that is ample even in hours of current maximum demands in the areas served by the 10 Stations.

This is only a part of a continuing program of betterments with an object of providing the greatest reliability of service. The South Side pumping stations made use of the new 79th Street tunnel for the first time under summer peak load conditions. Both Western Avenue and Rose-and Stations were repeatedly able to pump at rates formerly impossible without this tunnel.

The Cermak Pumping Station is undergoing extensive changes in the main discharge water piping due to the construction of the new expressway which utilizes depressed roadways both east and west of the Station.

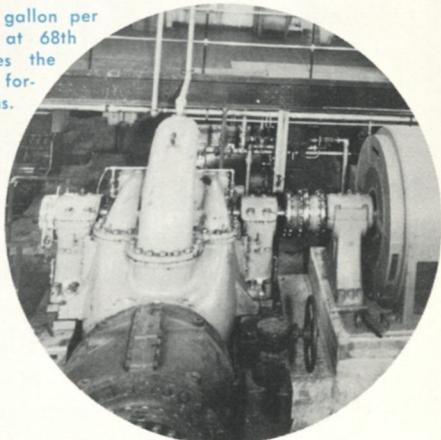
The Mayfair Pumping Station completed the last of its new boiler installations and is now operating with six new boilers and auxiliary equipment. Two new pumping units and a new discharge piping system are also being installed in this Station.

The Pumping Division has completed plans for the incorporation of the new Southwest Pumping Station into its operating network. This Station, which is to be completed during 1961 and placed in full service the following year, will have an initial rated capacity of 175 million gallons per day and an ultimate rated capacity of 275 million gallons per day.

This new station will greatly reduce current pumping loads on Western Avenue and Roseland Pumping Stations, insuring even greater dependability in the water service to the customers of the Southwest Side of the City and the nearby suburbs which use Chicago water.



This newly installed 50 million gallon per day electrically driven pump at 68th Street Pumping Station typifies the modernization program going forward at 10 City pumping stations.



DISTRIBUTION



A growing Chicago made heavy demands on the forces and facilities of the Water Distribution Division in 1960.

Construction of new public works projects, housing, expressways, streets and skyscrapers exerted continuous pressure on this Division to relocate, rebuild or extend mains throughout the vast water distribution system.

This Division has in its charge the responsibility for the design, construction, operation and maintenance of the water mains, valves, hydrants, and other appurtenances in the distribution system of the Water Works System. Its related functions include the determination of the proper size and type of meters, inspection of household, industrial and commercial plumbing facilities, and the installation of service pipe connections to water mains from homes and businesses.

Distribution Division: Designs, constructs, operates and maintains more than 4,000 miles of water mains, 45,000 fire hydrants, over 43,000 valves and other distribution facilities.

Some 34.5 miles of mains were added to the system by Division work crews in 1960 and 16 miles of mains were abandoned; a net gain of 18.51 miles as of December 31, 1960. There were 4142.39 miles of water mains of all sizes in operation in the distribution system.

Major construction included 330 feet of 16-inch diameter main; a mile of 24-inch main; nearly two miles of 36-inch main; two miles of 42-inch main; and about a mile each of 48-inch and 54-inch main. An additional 2,500 feet of 24-inch, 800 feet of 30-inch, and 8,000 feet of 36-inch main laid in connection with the construction of expressways, bridges and other public improvements also was placed in operation during the year.

Major water main construction projects during 1960 saw the completion of new mains in every area of Chicago. The principle projects completed were as follows:

- 1,166 feet of 36-inch and 1,570 feet of 48-inch pipe in Bryn Mawr Avenue from Gregory Street to Canfield Avenue.

- 330 feet of 16-inch pipe and 2,625 feet of 24-inch pipe in Birchwood Avenue from Harlem Avenue to Oconto Avenue, and in Oconto Avenue from Touhy Avenue to Howard Street.

- 1,270 feet of 48-inch pipe from Bryn Mawr Avenue to its intersection with River Road.

- 816 feet of 36-inch pipe in Central Avenue from Railroad Avenue to Flournoy Street.

- 5,476 feet of 36-inch pipe in Lotus Avenue from Flournoy Street to Madison Street; in Madison Street from Lotus Avenue to West End Avenue; and in West End Avenue from Long Avenue to Pine Avenue.

- 2,987 feet of 24-inch pipe

and 1,338 feet of 36-inch pipe in West End Avenue from Austin Boulevard to Pine Avenue; in Pine Avenue from West End Avenue to Kinzie Street.

- 1,672 feet of 48-inch pipe in 83rd Street from Pulaski Road to Kedvale Avenue; in Kedvale Avenue from 83rd Street to 84th Street.

- 5,518 feet of 54-inch main in Cicero Avenue from 83rd Street to 85th Street; in 85th Street from Cicero to Kildare Avenue; in Kildare Avenue from 85th Street to a point north of 84th Place.

In addition to the construction of such extensive water main projects as these, the Distribution Division repair crews performed maintenance and repair operations around-the-clock. By communication with radio-equipped maintenance trucks, work crews can be dispatched promptly at any hour to make emergency repairs anywhere in Chicago.

The crews expedite repair work upon information supplied by the public; the continuing surveys of the system conducted by the engineering staff; valve inspections; surveys conducted by leak crews and the inspections made by inspectors investigating service complaints.

The prevention of unseen and unheard water leakage in the thousands of miles of water mains underground in Chicago is a considerable problem. In this respect, the efforts of this Division have become nationally famous.

The Water Distribution Division crews are continuously developing new and better methods for detection of leaks. Engineers have come from scores of nations to see Chicago field crews find and repair leaking mains.

Of particular interest to foreign visitors is the dye test method of leakage detection pioneered by Chicago water works engineers. The elimination of these leaks reduces pumping requirements, damage to underground installations, and thus, operating costs. By means of a continuous program to reduce leakage, more than 10 million gallons of water have been saved per day in each year since 1932 in Chicago, and 1960 added another year to this good record.

The activities of the Plumbing Section of the Water Distribution Division are concentrated on the prevention of contamination in the water supply as it flows from the mains to the consumer. Inspectors rigorously enforce the provisions of the Chicago Plumbing Code, which prohibits unapproved water-

using appliances, poor plumbing design or workmanship, undersized piping and improper or inferior plumbing materials. Inspectors investigate all complaints of inadequate water supply, leakage and water waste.

Some idea of the vast number of field inspections made in 1960 may be realized from the fact that new installations of air conditioning and refrigeration equipment were checked for Code violations. Water-using appliances—clothes washers, dishwashers, etc.—are inspected as well as new service pipes.

In 1960, plumbing inspectors carried out 2,944 first inspections; 3,509 re-inspections; 25 fire report inspections; 3,505 wrecked building inspections; 30,202 building permit and service pipe inspections; 2,789 meter inspections; 7,951 water con-

tamination prevention inspections. In addition, 21,171 inspections were made for the Building Department; 8,678 plan examination inspections; 41,742 wastage survey inspections; 10,467 pipe installation inspections; 1,523 special investigations; 46,656 fixture inspections; and 169,851 fixture re-inspections.

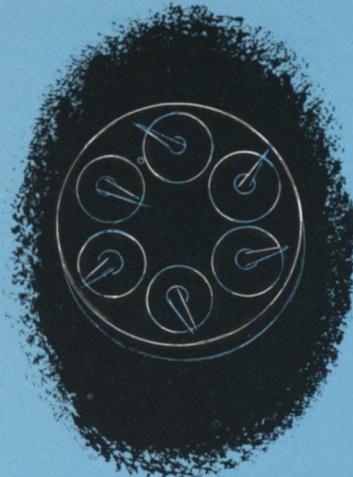
The Plumbing Laboratory tests water-using appliances to guarantee their conformity with City ordinances and ensure that they do not have any defect which might cause contamination in the water system when they are placed in use.

Hundreds of tests were conducted during 1960, including those on animal watering devices and coin-operated self-service dry-cleaning equipment.

There are 4,142 miles of water mains, some even larger than this 48-inch diameter main, underneath Chicago's streets.



METERS



Meter Division: Tests, repairs and reconditions water meters, installs all meters larger than two inches in size. Inspects meter installations and makes field repairs. Maintains complete meter control records.

Chicago meters more water than any other city in the world. 4,164 new meter installations in 1960 brought the total meters in service in the system at the end of the year to 151,826. The Water Meter Division maintains control over these meters.

A complete permanent record of every meter is kept from the date of purchase until it is discarded. A record is also kept of each metered property showing the history of the meters that have serviced it.

The Meter Division draws up specifications for meters of all sizes and types. No meters are installed in the Chicago Water System unless they comply with such specifications.

The Meter Shop tested for accuracy 23,561 meters in 1960. Of these, 15,313 were overhauled

in the shop; 540 were new meters tested in the shop and 3,660 were new meters tested at the vendor's factories, under City supervision. Testing meters at the factories rather than in the shop resulted in a saving to the City of over \$5,000.

102,691 job orders were required to carry out the operations of the Meter Division during the year. These orders covered 17,029 meter repair jobs in the field and the balance covered meter tear down and reassembly jobs and meter part fabrication and rehabilitation jobs in the shop.

Each meter installed by a Master Plumber is inspected to ascertain if the installation is a proper one and a complete report is made to the Water Collection Division for billing purposes.

The primary function of the Water Collection Division is the assessing, billing and collecting of water consumer accounts. During 1960, the Division performed this service for 500,426 accounts of which 348,600 were assessed rate accounts and 151,826 were metered rate accounts.

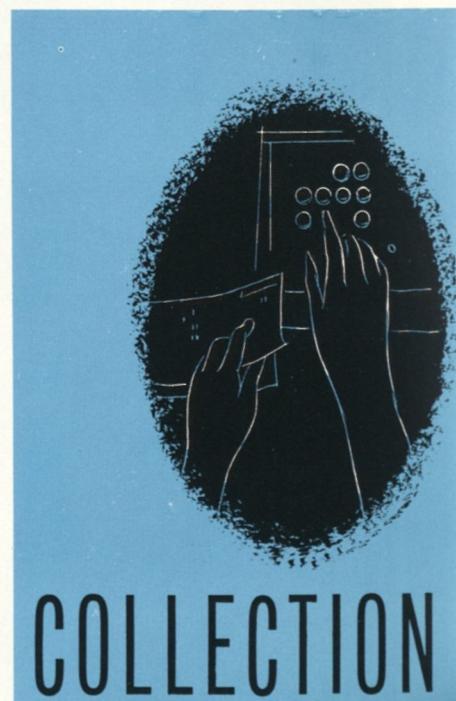
The total collections made by the Division amounted to \$40,071,261.20 in 1960; \$8,916,408.23 for assessed rates; \$30,868,364.13 for metered rates and \$286,488.84 for miscellaneous collections.

The field forces of the Water Collection Division made 1,247,464 visits and a corresponding number of reports dur-

ing the year. These reports consisted of 1,077,914 readings covering water registrations; 114,400 examinations for assessment purposes, and 47,989 visits for shut-offs to enforce payment or to turn on water for consumers. Division inspectors made 6,861 examinations of premises for leakage and wastage of water to determine reasons for abnormal usage.

The Water Collection Division uses the latest available electronic tabulating equipment in its billing and collecting operation and is constantly perfecting its service to the public by the installation of new techniques and practices.

Water Collection Division: Responsible for the assessment of charges for non-metered water accounts; reading water meters for metered water accounts; billing and collecting of water revenues.



REVENUE AND EXPENDITURES

WATER WORKS CERTIFICATES OF INDEBTEDNESS

REVENUES	
Water bills paid.....	\$39,927,870
Fees for new service outlets.....	75,976
Steam furnished to Chicago Park District.....	160,675
Interest received from deposits and investments..	691,942
Rents and miscellaneous.....	501,823
Total revenue	<u><u>\$41,358,286</u></u>

Balance 1/1/60	\$18,305,979
Add: Miscellaneous income	16,324
Reimbursement from working capital accounts	178,420
	<u><u>\$18,500,723</u></u>
Construction and improvements.....	<u><u>28,746,168</u></u>
Balance 12/31/60	<u><u>\$10,245,445*</u></u>

*Deficit—Plans were made to sell Water Works Certificates of Indebtedness during 1960 but because of the unfavorable market this was not done. Instead, the Certificate Fund borrowed cash from the Revenue Fund to cover this deficit. The \$10,245,445 borrowed from the Revenue Fund will be repaid from funds realized from the sale of the Water Works Certificates of Indebtedness sold on March 1, 1961.

EXPENDITURES FOR OPERATION AND DEBT SERVICE

Total revenue	\$41,358,286
Reimbursement from working capital accounts—1960 adjustment	1,136,753
Sub-total	<u><u>\$42,495,039</u></u>
Cost of operations.....	\$21,204,821
Repairs and maintenance.....	8,766,073
Judgments	74,837
Redemption of certificates.....	5,460,000
Interest on certificates and judgments.....	4,889,430
Refunds on assessments.....	18,972
Total	<u><u>\$40,414,133</u></u>
Balance available	\$ 2,080,906
Balance from prior years to January 1, 1960.....	17,925,747
Plus: Collection of accounts receivable previously written off	1,904
Reimbursement from working capital accounts—prior years adjustment.....	694,061
Sub-total	<u><u>\$20,702,618</u></u>
Less: Accounts receivable written off.....	\$ 235,905
Increase in reserve set up for Water Pipe Extension Certificates	129,782
	<u><u>\$ 365,687</u></u>

Available for capital expenditures and Debt Service Reserve.....	\$20,336,931
Capital improvements from revenue in 1960....	\$ —0—
Debt Service Reserve at 12/31/60.....	<u><u>12,485,457</u></u>
	<u><u>\$12,485,457</u></u>
December 31, 1960, balance available for appropriation and Debt Service Reserve.....	<u><u>\$ 7,851,474</u></u>

OTHER CASH ACCOUNT

Cash restricted for redemption of Water Pipe Extension Certificates	\$ 287,472
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1960 EXPENDITURES FOR WATER WORKS CAPITAL IMPROVEMENTS

Source of Funds	
Water Works Construction	Water Certificates
Water mains	\$ 6,805,042
Filtration (Central)	12,480,259
Filtration (Central) tunnel.....	148,608
Tunnel — 79th Street.....	2,193,464
Pumping stations and miscellaneous.....	7,118,795
	<u><u>\$28,746,168</u></u>

The above tabulations represent a preliminary financial summary of the Water Fund. Final financial statements will be included in the City Comptroller's report for 1960.

SEWERS



Bureau of Sewers: Operates and maintains some 3,800 miles of sewers. Has supervision and control of all matters relating to house drains and sewers. Maintains complete atlas record of public sewer system and sewer connections. Constructs and maintains bench monuments and makes recommendations for the establishment of street grades. Responsible for the issuance of all permits covering sewer repairs and the installation of connections to the system.



Bureau of Sewers
officials inspect completed
portion of Leamington Avenue
Sewer System under
Southwest Side. They stand in
30 foot high diversion chamber
through which storm water
will drain into
Sanitary and Ship Canal.



Bureau of Sewers workmen building a brick weir in an 8½ foot sewer to control dry weather flow.

The Bureau of Sewers is one of the largest utilities in the nation. In 1960, nearly 70 miles of sewers were constructed to bring the total length of sewers in this network to 3,815 miles.

Of this total about three miles of sewers were constructed by the work forces of the Bureau. Eight miles of new sewer were built by private contractors under the Sewer Bond Fund Program. Under the special assessment program, the Board of Local Improvements built 17 miles of new sewer and two miles more were constructed in connection with superhighway construction.

Continuous additions to the drainage system have been made mandatory by radical changes in land use patterns throughout Chicago. There is comparatively little land remaining that does not have construction of one sort or another on it. New Factories and two-story buildings with large roof areas, the great increases in roadways, highways and parking areas and the like have vastly increased the amount of impervious surface area. The intensity of storm runoff, therefore, has increased in severity, taxing in particular those sewers built several decades ago and designed to handle peak loads in the era before expressways and parking lots so greatly reduced

the natural ability of soil to hold high rain yields.

However, the vast sewer mileage added to the system since 1948 when sewer bond funds were made available, has greatly reduced the amount of flooding of basements and underpasses during rainstorms. In 1960, there was much less interference with traffic from flooded underpasses and far fewer flooded basements than usual, even when the lesser severity of the storms during the year is considered.

The principle function of the Bureau is to maintain in good operating order the miles of underground sewer pipe in Chicago. On the effectiveness of its operations depends the health and well-being of the entire metropolis.

Maintenance of this system required workmen to conduct 175,284 inspections; make 20,748 repair jobs; scrape over 5 million feet of sewers; clean over 546,000 catch basins and answer 16,910 complaints.

Opening of the Northwest Expressway has brought to a close many years of planning and consultation with City and County highway engineers. Their co-operation with the Bureau made possible the extensive relocation of sewers, large and small, occasioned by this vast undertaking.

The Bureau will continue to meet with engineers of other agencies as work progresses for the South and Southwest Expressways to hasten the completion of these vital public works projects.

A lesser known function of the Bureau concerns its responsibility for checking and approving all plans involving changes or additions to the drainage system. This requires the continuous updating and improvement of drain atlases maintained by the Bureau.

The Bureau also concerns itself with the establishment of street grades and ordinary benches and the construction and maintenance of standard bench monuments, including the establishment, by precise leveling, of their elevations based on Chicago datum, which is 579.88 feet above New York mean tide.

These monuments are occasionally destroyed during various types of construction and must be re-established. Also, new monuments must be built and established in various sections of the City. Bench work is very exacting and tedious. It requires the running and rechecking of miles of precise levels and it is work that can only be done in very favorable weather. In 1960, 24 bench monuments and 113 street grades were established.

1960 MAJOR WATER STATISTICS

Population and Area Served (Based on reliable estimates)

Population supplied:

Chicago (1960 U.S. Census 3,550,404).....	3,550,000
Suburban (Year-end census as revised).....	873,000
Total.....	4,423,000

Area served (in square miles):

Chicago	224
Fifty-eight suburbs	161
Total.....	385

Per Capita Consumption

Gallons
Per Day

Chicago	255
Suburban	141
Average	232

Chemical and Physical Qualities of Water

Total hardness (as parts per million Calcium Carbonate) ..	132
Water temperatures: Intake (Dever Crib)	
Average	46.9°F.
Maximum	70.0°F.
Minimum	32.0°F.

Pumpage

Annual	Gallons
Chicago	331,218,000,000
Suburban communities and industries (metered)	45,014,000,000
Total*.....	376,232,000,000

*(Amount through Western Ave. Reservoir.. 935,000,000)

Annual Metered Consumption
in Chicago 46.4%† of Chicago pumpage).... 153,540,000,000

†(Percentage of Revenue from Metered rates 77.59%)

Daily

Total daily average.....	1,027,955,000
Maximum day, Sept. 7, 1960.....	1,499,320,000
Maximum hour (rate) Sept. 1, 3 P.M.....	1,841,000,000
Daily Average — Chicago.....	904,967,000
Daily Average — Suburban.....	122,989,000

Purity Control

Laboratory samples examined:	
Bacteriological Laboratory	42,094
Chemical Laboratory	173,010
Microscopically for plankton.....	7,106
Electron Microscope	10,359
Total samples examined.....	232,569

Bacteriological Results

Annual average coliform organisms per 100 ml*	South District (filtered)	North & Central District (chlorinated only)
Raw	65.18	37.1
Plant outlet	0.010	—
Pumping stations	0.008	0.29
Distribution system	0.025	0.21

*(U. S. Public Health Service Standard for safe drinking water permits a maximum average of 1.0 coliform organisms per 100 ml.)

Purification Treatment

Gallons

Complete Filtration Treatment.....	133,198,400,000
Chlorination Treatment only.....	244,058,180,000

Chemicals Applied — Tons

	Filtration Treatment	Chlorination Only
Chlorine	1,263	1,335
Aluminum Sulfate (as Al)	327	—
Activated Carbon	1,358	—
Lime	1,633	—
Ferrous Sulfate (as Fe)	735	—
Ammonium Sulfate	291	—
Anhydrous Ammonia	51	—
Sodium Silicate	24	—
Hydrofluosilicic Acid (23%)	2,610	3,988
(As Fluorine)	474	809
Sulfuric Acid	6	—

Supply

Crib intakes in service.....	4
Emergency shore intake.....	—
Miles of water supply tunnels under lake and land (6 to 16 feet in diameter).....	67.9

Pumping — 1960

Pumping stations	10
Pumps available for service.....	49
Installed pumping capacity (Million gallons per day)	2,695

Annual Pumpage

	Million Gallons
By electrically driven pumps.....	131,511
By steam driven pumps.....	244,721
Total annual pumpage.....	376,232
Coal used by steam powered pumps (tons).....	140,214
Electric power used by electrically powered pumps (kilowatt hrs.)	64,614,000

Distribution

Water Mains: (in miles)	
In use—December 31, 1960.....	4,142.39*
Extended	34.56
Abandoned	16.05
Net addition to system.....	18.51
Diameter of pipe (inches)	4 to 54

Fire Hydrants:

In use—December 31, 1960.....	45,244
Installed	495
Abandoned	372
Net Increase	123

Gate Valves:

In use—December 31, 1960.....	43,267*
Installed	579
Abandoned	254
Net Increase	325
Pressure range in mains (lb. per square inch)	25-55
Average pressure at curb (lb. per square inch)	40
Miles of pipe tested for underground leakage.....	89.03
Underground main leakage stopped 1960 gallons per day.....	10,170,200
Premises inspected—house to house leakage survey....	41,742
Repaired main breaks—4 inch to 48 inch in diameter....	228

*Adjustment figure

Meters:

In service—December 31, 1960.....	151,836
Installed by master plumbers.....	1,560
Installed by Water Distribution Division.....	2,614
Total.....	15,174

Removed	692
Net increase	3,482
Repaired on premises.....	15,775
Repaired in shops.....	15,513
Tested	23,561
Non-metered (assessed rate) services.....	348,600
Total Services (assessed & metered).....	500,436

DEPARTMENT OF WATER AND SEWERS

JAMES W. JARDINE.....Commissioner of Water and Sewers

RAYMOND D. JOHNSON.....Administrative Engineer

BUREAU OF WATER

W. W. DeBerard.....	Deputy Commissioner for Water and Chief Water Engineer
H. H. Gerstein.....	Assistant Chief Water Engineer
PUMPING	
J. L. Weeks.....	Engineer of Water Pumping
PURIFICATION	
J. R. Baylis.....	Engineer of Water Purification
DISTRIBUTION	
J. T. Garrity.....	General Superintendent
T. F. Foley.....	Assistant General Superintendent
E. Edelstein	Chief Engineer
METERING	
M. I. Sheridan.....	Superintendent
COLLECTION	
J. J. Ellicott.....	Superintendent

BUREAU OF SEWERS

Thomas D. Garry.....	Deputy Commissioner for Sewers
Arthur E. Cook.....	Administrative Assistant
A. J. Schafmayer.....	Chief Engineer
INSPECTION	
Harry M. Forrey.....	Asst. Chief Engineer
DISTRICT REPAIR	
Joseph Rostenkowski	Superintendent
John Kilroe	Superintendent
Ralph McNamara	Superintendent
Vincent Shannon	Superintendent
DISTRICT CLEANING	
Tenney S. Ford.....	Engineer
Charles E. Benson.....	Engineer
David Goldberg	Engineer
CONSTRUCTION	
Edward Gill	Superintendent
ENGINEERING	
ARTERIAL REPAIR AND CLEANING	

ADMINISTRATION AND FUNCTIONS

The Department of Water and Sewers is divided into two major units—the Bureau of Water and the Bureau of Sewers.

The Bureau of Water provides water to all of Chicago and 58 suburbs, and bills and collects water charges for this service. The Bureau is composed of a Pumping Station Operation Division which operates 4 water intake cribs and 10 pumping stations to pump the water into the system; the Water Purification Division, which operates the water filtration plant and super-

vises treatment of the water to insure its safety and palatability; the Water Distribution Division, which plans, constructs and maintains the water mains to transport the water from the pumping stations to the user's faucet; the Meter Division, which maintains and checks the accuracy of the meters that measure the amount of water used by the consumers, and the Collection Division, which bills, collects and accounts for water charges.

The Bureau of Sewers operates and maintains Chicago's vast

public sewer system. The Bureau is composed of an Engineering Division that plans and designs sewer repairs and extensions; a Cleaning Division that flushes and scrapes sewers and cleans catch basins on a district basis; a Repair Division that makes repairs to the sewer system on a district basis; a Motor Fuel Tax Division, that does both repair and cleaning work on arterial highway sewers, and an Inspection Division that supervises construction and installation of connections.

1960 MAJOR SEWER STATISTICS

Existing Sewer System:	
Miles of Sewers.....	3,815.75
Catch Basins	200,475
Manholes	137,406

1960 New Sewer Construction:	
Miles of Sewers—all sizes.....	69.6
Catch Basins	3,701
Manholes	2,087
Of the above, 2.9 miles of various sizes of sewers, 25 catch basins and 94 manholes were constructed by Bureau of Sewers work forces.	

Inspections	220,103
Complaints Handled	16,910

Repairs:	
Total Number of Sewer System Repair Jobs Completed	20,748
Main Sewer Breaks.....	464
Catch Basins	14,365
Manholes	5,616
Gutter Grates and Basin Outlets.....	303

Cleaning:	
Dirt Removed in Cleaning Operations—Cubic Yards..	240,207
Sewers Scraped—Feet	5,122,166
Catch Basins Cleaned.....	546,791
Street Grades Established and Approved by City Council	113
Standard Bench Monuments and Ordinary Benches Established	24

Receipts:	
House Drain Permit Fees.....	\$159,355
Other Permit Fees.....	31,698
Special Deposits	60,666
Out-of-town Sewer Connection Fees.....	67,460
Drain Layers' License Fees.....	29,250

Total Receipts	\$348,429
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Supplements covering complete 1960 water or sewer statistics are available upon request.

CAPITAL WORKS



Planning new water works facilities for the future of metropolitan Chicago is one of the most important functions of the engineering and administrative staffs of the Water Works System.

Each year, in cooperation with the Departments of Public Works and City Planning, the Department of Water and Sewers publishes a revised water works capital improvement construction program for the coming five years.

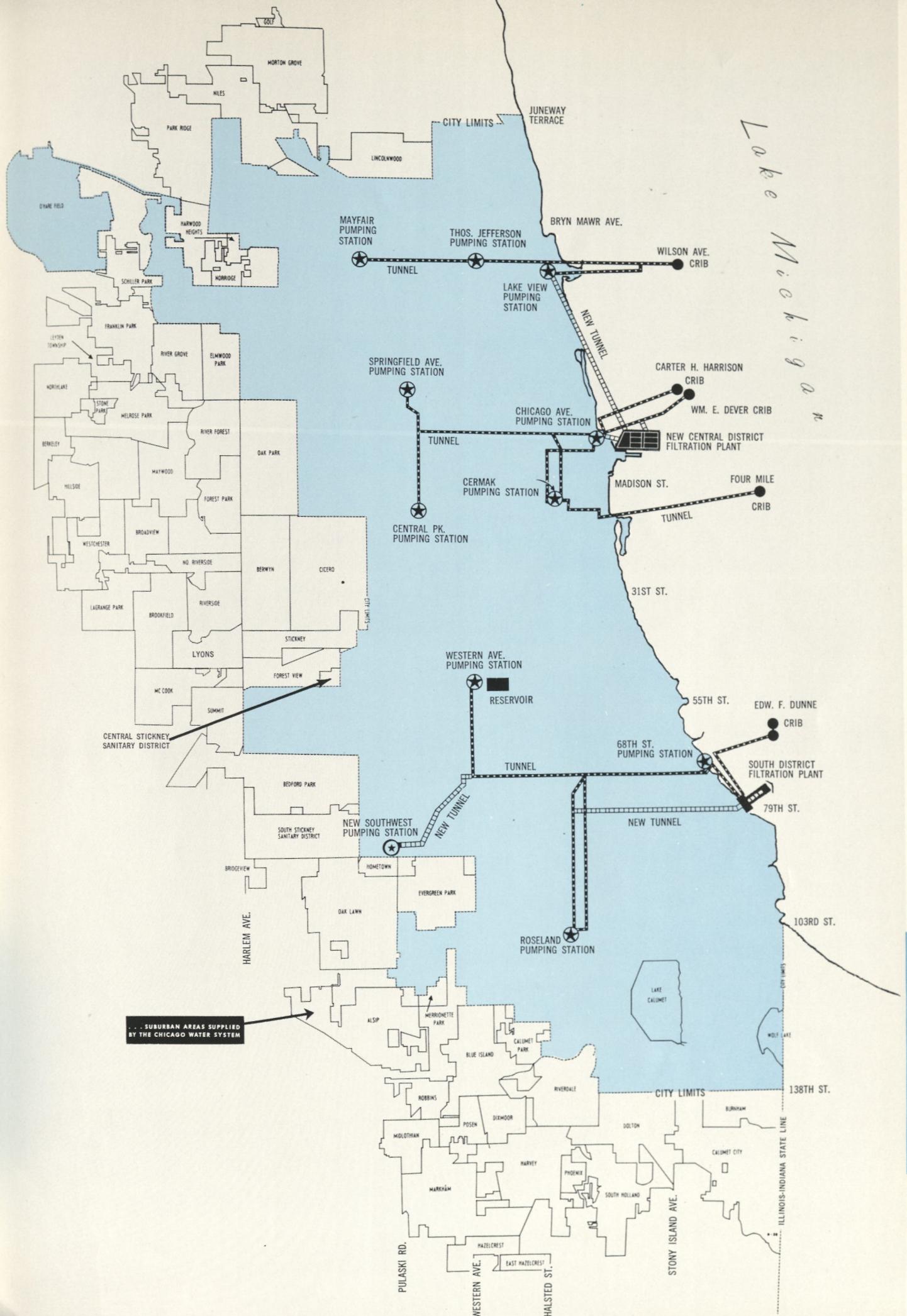
The current five-year program also looks ahead 20 years or more. For example, the completion of the present capital improvement program will provide the City with ample filtration, tunnel, pumping station and main capacity to meet the demands industry and population are expected to make through the year 1980.

Capital works projects completed in 1960 entailed the ex-

penditure of some 29 million dollars. During the five-year period ending December 31, 1960, the water utility built: 151 miles of mains; 11 miles of water tunnels; the Central District Filtration Plant was brought to 64% of completion, and the new Southwest Pumping Station to serve a quarter million users and having an initial capacity of 175 million gallons a day, was brought to 40% of completion.

The 1961-65 \$104 million five-year capital construction program includes \$7 million in water tunnel construction; \$42 million to complete the Central District Filtration Plant; \$6 million to expand by 50 percent the 320 million gallon capacity South District Filtration Plant; \$42,400,000 for water main construction, and \$6,600,000 to increase pumping station capacities and complete the construction of the Southwest Pumping Station.

MAP SHOWING THE CRIB INTAKES, FILTRATION PLANTS, PUMPING STATIONS, RESERVOIR AND TUNNELS OF THE CHICAGO WATER SYSTEM. THE SYSTEM SUPPLIES WATER TO 4,423,000 PEOPLE IN A 385 SQ. MILE AREA IN CHICAGO AND 58 SUBURBS. SOME 4,100 MILES OF WATER DISTRIBUTION MAINS ARE NOT SHOWN . . .



•ANNUAL REPORT FOR 1960 • DEPARTMENT OF WATER AND SEWERS • CITY OF CHICAGO•

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